A new subspecies of the genus *Leptoconops* from Amami-oshima, Japan (Ceratopogonidae : Diptera)

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Abstract: A new subspecies of the biting midge, *Leptoconops* (L.) *nipponensis oshimaensis* is described based on the female specimens collected from Amami-oshima Island, Japan. This is differentiated from the type species, *L. (L.) nipponensis* Tokunaga, 1937 by the different value of antennal ratio, the longer bristle-like setae on vertex and on prescutellar area of the thorax and the stoutness of the spines on the basitarsus of fore leg.

Following complaints of biting midge infestations from residents of Katoku and Isu villages on sandy coast of the southern part of the Amami-oshima Island, collections were made on April 15 and 17, 1977, to identify the causative species and to obtain basic information relevant to the control measures.

Examinations of the female specimens collected on human-bait from Katoku village have showed that this species belongs to the genus *Leptoconops* and has a close resemblance to *L. (L.) nipponensis* Tokunaga which is so far the only species of the genus from Japan and has been reported to be distributed in the south-west area of Honshu, main Island (Tokunaga, 1937; Nagahana *et al.*, 1959; Ishigami, 1959).

To confirm the identification of this species we made a comparison with the 14 female specimens from Yonago, the type locality of *L. nipponensis* in addition to the original and re-descriptions given by Tokunaga (1937) and by Chanthawanich and Delfinado (1967).

As a result, it was revealed that this species was almost identical to *L. nipponensis* except that a few features were constantly different. Therefore, we consider and describe this species as a new subspecies of *L. nipponensis*.

DESCRIPTION

Leptoconops (Leptoconops) nipponensis oshimaensis sp. nov.

Female: Body length 2.0 mm. Wing (from arculus to wing tip) 1.15 mm long and 0.52 mm wide.

Head: Blackish brown, 0.30 mm high and 0.34 mm wide. Vertex with 4 bristle-like setae in the middle between eyes as well as a few lateral ones (Fig. 2). Eyes bare, widely separated by distance equal to 6 facets (0.08 mm). Antenna (Fig. 7) dark brown, composed of scape, pedicel and 12 flagellar segments; 2nd and 3rd flagellomeres somewhat transverse, slightly shorter than breadth; 4th and 5th flagellar segments almost spherical and 6th to 11th ones shortly cylindrical, longer than wide; terminal segment elongate, about 3.6 times as long as its width and much shorter than 3 preceding segments together; antennal segments in

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Figs. 1-10 Female of *L. oshimaensis*

1. Wing, 2. Dorsal view of head and thorax, a. Frontal seta on vertex, b. Distance from the base of frontal seta to the nearest of the eye margin, c. Supra-alar seta, d. Dorso-median seta, e. Distance between dorso-median setae, 3. Ventral view of distal segment of abdomen, 4. Mandible, 5. Maxillary palp, 6. Tarsal segments of fore leg, 7. Antenna (hairs on 3rd to 9th flagellar segments are omitted), 8. Spermathecae, 9. Galea, 10. Lateral view of cercus

proportion of 7: 12: 5: 5: 6: 6: 6.5: 7: 7: 7.5: 7.5: 7.5: 18 (scape not measured). Mouth part about 1/2 length of head, with 14 setae on labella. Mandible (Fig. 4) with about 20 distinct teeth. Galea (Fig. 9) with a few inner teeth and about 20 outer teeth. Maxillary palpus mostly brown, 3rd segment, darkest of all and base of 4th segment completely pale; 3rd segment slightly swollen, with large sensory area occupying almost entire length of inner margin and with about 5 long setae (Fig. 5); length in proportions of 7: 7: 17: 20.

Thorax: Brownish black, shiny; mesonotum with 3 longitudinal rows of setae on dorsal surface and with scattered setae on each side; scutellum with 6 marginal bristle-like setae; postscutellum bare (Fig. 2).

Wing: Dirty white, oval in shape, with dark marking covering distal portion of radial cell (Fig. 1); *Rs* ending at middle of costal margin.

Legs: Dark brown, with tips of tibiae and tarsal segments paler; basitarsi of all legs with 5–10 stout spines in addition to one pair of apical ones (Fig. 6); 2nd tarsal segment of fore leg with only one apical spine, those of middle and hind legs with one pair of apical spines; tarsal claws symmetrical, each with a medium-sized basal tooth, being about 1/2 length of main tooth; proportional lengths from femur to 5th tarsal segment 25: 24: 10: 5: 4: 2: 5 in fore leg; 30: 26: 11: 6: 4: 2: 4 in middle leg; and 32: 30: 15: 10: 5: 3: 5 in hind leg.

Abdomen: Mainly brown, the apical segments darker; 2nd and 3rd tergites bare except a few setae on either lateral portion; 4th to 7th tergites also almost bare with a few to several setae on lateral and posterior margins; lateral pleural membrane bare; 2nd sternite bare; 3rd to 7th sternites with several setae along lateral and posterior margins and a few setae medially; 3rd to 6th sternites each with 4 spots shaped as in Fig. 3 on which microtrichia is absent; cerci elongate caudad (about 1.0 mm) nearly 2.5 times as long as its basal broadest portion (Fig. 10); spermathecae 2 in number, well sclerotized, oval and equal (0.05 mm × 0.04 mm) (Fig. 8).

Locality: Amami-oshima, the Amami Islands, Japan.

Holotype: Alcoholic female, collected by Mr. Y. Noboru, from Katoku, Setouchi-cho, Oshima-gun, Kagoshima Pref., on April 4, 1977.

Paratypes: Twenty alcoholic females, same data and locality as holotype.

Specimens for reference: *L. n. nipponensis* females—6 specimens from Yonago, Tottori Pref., collected by Prof. M. Nagahana, in 1960, and sent through Dr. S. Kitaoka, and 8 specimens, same locality, collected and sent to us by Prof. M. Nagahana, July, 1977. Types will be deposited in the National Science Museum in Tokyo.

Remarks: According to the original- and re-descriptions by Tokunaga (1937) and by Chanthawanich and Delfinado (1967), this new subspecies is easily differentiated from the type subspecies, *L. nipponensis nipponensis* which was described to have a pair of apical spines on 2nd tarsal segment of fore leg and the ultimate segment of the antenna as long as the 3 preceding segments put together. However, all the 14 specimens of *L. n. nipponensis* from the type locality have been found to have a single apical spine on 2nd tarsal segment of fore leg instead of 2 spines. It therefore seems that this feature can not be used reliably in identification of the relevant species. On the other hand, the value of antennal ratio appears to be considerably constant. In *L. n. oshimaensis* the terminal segment of the antenna is much shorter than the 3 preceding segments together (total length of the 3 preceding segments/terminal segment = 0.82 ± 0.05 (mean $\pm$ standard deviation), range = 0.73–0.89, $n=12$), whereas in *L. n. nipponensis* the value of this ratio is 0.96 ± 0.04 (range = 0.92–1.00, $n=4$), that is, the terminal segment of the type species is nearly as long as the 3 preceding segments together as mentioned by the previous authors. Apart from this difference, this subspecies is separable from *L. n. nipponensis* by the following features. The frontal setae of 4 setae in the middle on vertex are much longer than the distance from their bases to the nearest of the eye margin in *L. n. oshimaensis* ($a/b = 1.85 \pm 0.23$, range = 1.63–2.25, $n=8$). However, those of

L. n. nipponensis are almost equal in length to the distance from their bases to eye margin ($a/b=0.93\pm0.02$, range =0.75–1.13, $n=10$). Similarly, the relative lengths of some setae on dorsum of the thorax which are indicated in Fig. 2 may be used in identifying these subspecies. The dorso-median setae (d) on prescutellar area of the present subspecies are almost 1/2 as long as the distance between them (e) ($e/d=2.07\pm0.13$, range=1.85–2.27, $n=8$) and are nearly equal in length to the supra-alar setae (c) on caudolateral corners of the scutum ($c/d=1.00\pm0.08$, range =0.9–1.1, $n=8$). In *L. n. nipponensis*, the values of e/d and c/d were 4.25 ± 0.26 (range =3.82–5.00, $n=8$) and 1.70 ± 0.03 (range =1.55–2.00, $n=6$), respectively. Namely, the length of setae d of *L. n. nipponensis* is about 1/4 the inter-setal distance (e). Furthermore, although the spines except 2 apical ones on the basitarsus of fore leg of *L. n. oshimaensis* are variable in number (median=7, range =5–10, $n=10$) and overlap the range of *L. n. nipponensis* (median =5, range=3–9, $n=25$), at least, some of spines of *L. n. oshimaensis* are always the same as the larger spine of 2 apical ones in length and stoutness. On the contrary, those of *L. n. nipponensis* appear to be smaller or more slender than the larger one of 2 apical spines.

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REFERENCES

- Chanthawanich, N. and M. D. Delfinado (1967): Some species of *Leptoconops* of the Oriental and Pacific regions (Diptera, Ceratopogonidae). *J. Med. Entomol.*, 4 (3) : 294–303.
- Ishigami, K. (1959): On morphology and ecology of the biting black gnat *Leptoconops nipponensis* Tokunaga (Ceratopogonidae). *Yonago Igaku Zasshi*, 10 (1) : 179–203.
- Nagahana, M., K. Ishigami and H. Toyama (1959): On the geographical distribution of biting black gnat, *Leptoconops nipponensis* Tokunaga and on the human blood sucking habits of the species. *Yonago Igaku Zasshi*, 10 (1) : 207–208.
- Tokunaga, M. (1937): Sand flies (Ceratopogonidae, Diptera) from Japan. *Tenthredo*, 1 (3) : 233–338.

摘 要

奄美大島産 *Leptoconops* 属の新亜種について

奄美大島南部の東海岸に位置する花徳部落において主に春季の3, 4月にかけて発生し, 人を激しく襲う吸血昆虫の予備調査を1977年4月に行いトクナガクロヌカカ (*Leptoconops nipponensis* Tokunaga, 1937) に極めて類似した種の雌標本を人囮法によって多数得た。

トクナガクロヌカカの前記載および再記載の他, トクナガクロヌカカの基産地である鳥取県米子産の雌標本との形態を比較した結果, 本種は, 現在比較が可能な雌成虫に関してはトクナガクロヌカカとほとんど区別が困難な程類似しているが, わずかに触角末端節とその前3節を合せた長さの比, 頭頂および胸背後縁上の剛毛の長さ, さらに前脚第一跗節の剛針の大きさに一定した差が認められるので, 本種をトクナガクロヌカカの新亜種として報告する。